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bcil

▲ double groupoid geometry

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DOUBLE GROUPOID

for which

$$AS \left(\begin{array}{cc} & h \\ v & & v' \\ & h' & \end{array} \right) \tag{0.5}$$

is the free A -module on the set of squares with the given [boundary](#). The two compositions are then bilinear in the obvious sense. Alternatively, we can use the [convolution](#) construction $\bar{A}D$ induced by the convolution C^* -algebra over H and V . These ideas about algebroids need further development in the light of the algebra of [crossed modules](#) of algebroids, developed in (Mosa, 1986, Brown and Mosa, 1986) as well as crossed cubes of (C^*) algebras following Ellis (1988).

a groupoid internal to the [category of groupoids](#).
 "double groupoid geometry" is owned by [bcil](#).

Given two groupoids H, V over a set M , there is a double groupoid $\square(H, V)$ with H, V as horizontal and vertical edge groupoids, and squares given by quadruples

View style:

$$\left(\begin{array}{cc} & h \\ v & & v' \\ & h' & \end{array} \right) \tag{0.2}$$

This object's parent assume always that $h, h' \in H, v, v' \in V$ and that the initial and final points of these edges match in M as suggested by the notation, that is for example $sh = sv, th = sv$, etc. The compositions are to be inherited from those of H, V , that is

This is [version 4](#) of [double groupoid geometry](#), born on 2010-01-28, modified 2010-02-13.
 Object id is 830, canonical name is DoubleGroupoidGeometry.
 Accessed 348 times total.

$$\left(\begin{array}{cc} & h \\ v & & v' \\ & h' & \end{array} \right) \circ_1 \left(\begin{array}{cc} & h' \\ v' & & v'' \\ & k' & \end{array} \right) \circ_2 \left(\begin{array}{cc} & k \\ v' & & v'' \\ & k' & \end{array} \right) = \left(\begin{array}{cc} & hk \\ v & & v'' \\ & h'k' & \end{array} \right) \tag{0.3}$$

This construction is right adjoint to the forgetful [functor](#) which takes the double groupoid $\square(H, V)$ to the set of squares with these as horizontal and vertical edges.

Classification:
[Physics Classification: 00 \(GENERAL\)](#)
[02 \(Mathematical methods in physics\)](#)
[03 \(Quantum mechanics, field theories, and special relativity\)](#)
[03.65.Fd \(Algebraic methods\)](#)

This allows us to construct for at least a [commutative \$C^*\$ -algebra](#) A a [double algebroid](#) (i.e. a set M with two groupoids H, V over M and a double groupoid $\square(H, V)$ over M).

Pending Errata and Addenda

None.

Discussion

Style: Expand:

$$\begin{array}{ccc}
 AS & \xrightleftharpoons{s^1} & AH \\
 \uparrow \uparrow \uparrow & \xrightarrow{t^1} & \uparrow \uparrow \uparrow \\
 AD & \xrightleftharpoons{s^0} & AH \\
 \uparrow \uparrow \uparrow & \xrightarrow{t^0} & \uparrow \uparrow \uparrow \\
 AV & \xrightleftharpoons{s} & M \\
 \uparrow \uparrow \uparrow & \xrightarrow{t} & \uparrow \uparrow \uparrow
 \end{array} \tag{0.4}$$

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